

Vibration

Vibration monitor w/ 3No. sensors and 1 No Enviroguard

These are installed along the face of the viaduct closest to the piling works. The units are fixed to 3 vertical piers and monitoring activity 24/7 back to Maybe hire LIVEsite systems

Triger levels

Trigger levels agreed with Kam/TFGM

TRIGGER LEVELS

Trigger levels for the monitoring have been set following the baseline period and agreed with TFGM/Metrolink

Trigger Levels Vibration Monitored 24/7

Trigger level	mm/s ²	Action Required
Green	<3.0mm/s ²	No Action
Amber	±3.0mm/s ²	Stop and review works and methodology; Reduce work periods. before works restart Contact and consult KAM & TFGM
Red	±5.0 mm/s ²	Stop works, review incident, look at work programme, and agree a revised methodology with KAM & TFGM before restarting work.

Data transferred via 3G/4G networks and presented on Maybe web portal LIVEsite (www.mabeylivesite.co.uk). Email alerts have been configured for the above parameters and secure access provided for site team

Environmental Dust and Noise

Noise/Dust – 2 No. Envirogaurd fixed logging enclosures comprising of:

1 No. Class 1 Noise monitors (BS EN 61672-1 & 3:2014 compliant)

1 No. PM10 dust & particulate monitors (MCERT device)

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Movement / Settlement Monitoring –

installation of 24 No. wireless bi-axial tilt sensors on angled tilt beams 12 No. within each arch of the viaduct. Within each arch these have been installed as 6 No. at chest height and a further 6 No. installed higher on the arch to monitor for any deflection the structure may see.

An additional 3 No. tilt sensors to be installed on the south face of the viaduct, as well as 2 No. tilt sensors on the 3rd party wall across Century St

These tilt sensors have been connected to a locally installed logger, which will upload the data onto the LIVEsite portal.

All tilt sensors (where line of sight is possible) have been installed with reflective survey targets and a baseline survey has been taken.

All subsequent monitoring readings are to be compared against the baseline readings alongside the trigger levels. During piling works readings are to be taken twice daily, prior to and at end of the working day.

Reports will be submitted monthly to TGM and Metrolink regardless of Amber or Red movements recorded.

Trigger level	MM	Action Required
Green	<3.0mm	No Action
Amber	<6-8mm	Stop and review works and methodology; Reduce work periods. before works restart Contact and consult KAM & TFGM
Red	10mm+	Stop works, review incident, look at work programme, and agree a revised methodology with KAM & TFGM before restarting work.

Note :- The above trigger levels can be monitored in MM or Degrees IE. 3.mm = 0.171

All monitoring readings are 24/7 Data transferred via 3G/4G networks and presented on Maybe web portal LIVEsite (www.mabeylivesite.co.uk). Email alerts have been configured for the above parameters and secure access provided for site team

Actions

Green: Carry on with normal works any movement will be closely monitored to check if the structures are stable, and movements are not accelerative.

Amber: Stop works and review working procedures and assumptions to provide assurance to TFGM/Metrolink that the total movement will not be excessive, or to warrant modifying working methods.

Red: Stop works immediately if this limit is exceeded until the reason for reaching the limit has been identified, TFGM/Metrolink to be contacted and any remedial action has been agreed and if it is necessary for a 3D survey of the track to be undertaken to establish if movement has affected track levels.

Red - Amber contact details

Contact detail in the event of an Amber or Red trigger level

David Ray Assured CMS Site Manager

Billy Britnell Assured CMS Operations Manager. Tel: 07882494196

Peter Hemingway Track and Civil Engineer TFGM Tel: 0777 570 5726

David Tootel projects Manager KEOLIS Amey Tel: 07980983732

Jawad Yousafzi Civil Engineer KEOLIS Amey Tel: 07553 607785

Chris Metcalfe Telsafe Risk Management Ltd Tel: 07972594838

Track survey – Completed using Amburg survey trolley, cant and gauge readings taken also. Readings and data collected at the time of the survey have been issued to Assured-CMS and TFGM for reference.

Additional targets have been installed to accommodate further monitoring along the area of track containing the sedum trays (if required)

Note :- photographs of sensors locations will be submitted in due course